Course Requisite Change EFD Template

PURDUE UNIVERSITY | College of Engineering

Engineering Faculty Document No.:
EFD# 53-26
October 15, 2025

TO: The Engineering Faculty

FROM: The Faculty of the School of Mechanical Engineering

RE: Requisite Changes to ME 54555 Adv Appl of Motorsports Aerodyn

The Faculty of the School of Mechanical Engineering has approved the following requisite changes to a graduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Description Change for ME 54555 Adv Appl of Motorsports Aerodyn:

From:

Credit Hours: 3.00. This advanced course is designed to adapt the secrets of the rapidly developing field of high-speed vehicle design. From F1 to Indy Car, Advanced drag simulation and Sedan racing, this course provides clear advanced explanations for students and engineers who want to improve their design skills and to interpret how their favorite race cars aerodynamics is designed. It differentiates how aerodynamics win races, why downforce is more important than streamlining and drag reduction, designing wings and venturis, plus wind tunnel designs and more. Appraises the development process of advanced motorsports aerodynamics engineering. Extensive use of CFD in the development of race car aerodynamics.

To:
Credit Hours: 3.00. This advanced course is designed to build on the knowledge gain in Motorsports Aerodynamics Fundamentals which is a required prerequisite. Students will review thin airfoil theory, canonical pressure distributions, lifting line theory, limitations of potential flow, and the load-carrying capacity of natural boundary layers. Students will use panel codes for airfoil analysis, Trefftz plane analysis for induce drag analysis and the vortex lattice method for wing design. The design and optimization of wing end plates, diffuser roof profile and loss management will be taught. Students will learn how to control a vehicle aerodynamic platform. The Navier-Stokes Equations will be derived from first principles and the applications will be explained in detail. Students will learn the theory and practice of CFD for motorsports including hands on design exercises using commercial CFD software.

Requisite Change for ME 54555 Adv Appl of Motorsports Aerodyn:

Underline the changes to be made.

FROM:

None

TO:

Requisites: ME 54455 or MSPE 48200

Registration Restriction Change for ME 54555 Adv Appl of Motorsports Aerodyn

FROM:

None

TO:

MSPE-BSMTE, ME-MEME-MSPE or department approval

RATIONALE:

The updates above more accurately reflect the course and background needed to be successful in the course.

Dr. Eckhard A. Groll
William E. and Florence E Perry Head of the School of Mechanical Engineering

Link to Curriculog entry:

https://purdue.curriculog.com/proposal:34426/form